LAB # 4

DECISION MAKING IN PROGRAMMING USING IF ELSE STRUCTURE

C++ if/else Statement

An **if** statement can be followed by an optional **else** statement, which executes when the boolean expression is false.

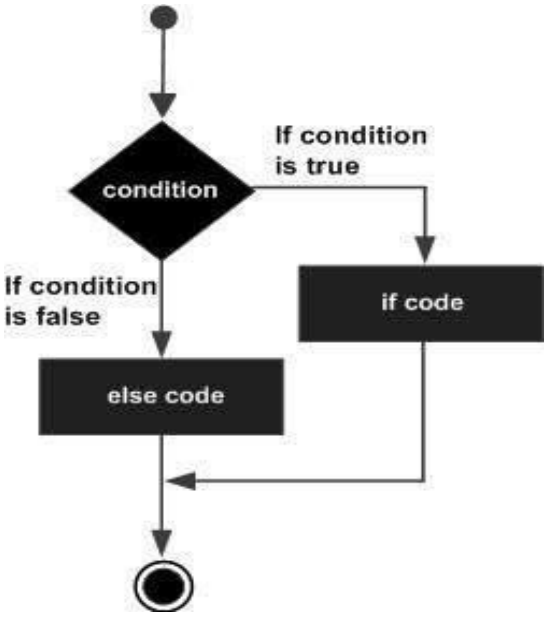
Syntax

The syntax of an if...else statement in C++ is –

```
if(boolean_expression)
{
// statement(s) will execute if the boolean expression is true
}
else
{
// statement(s) will execute if the boolean expression is false
}
```

If the boolean expression evaluates to true, then the if block of code will be executed, otherwise else block of code will be executed.

Flow Diagram



Example

```
#include <iostream>
using namespace std;
int main ()
{
        // local variable declaration:
        int a = 100;
        // check the boolean condition
        if( a < 20 ) {
        // if condition is true then print the following
        cout << "a is less than 20;" << endl;
        } else {
        // if condition is false then print the following
        cout << "a is not less than 20;" << endl;
        }
        cout << "value of a is : " << a << endl;
        return 0;
}
```

When the above code is compiled and executed, it produces the following result −

```
a is not less than 20;
value of a is : 100
```

if/else Statement

An if statement can be followed by an optional else if...else statement, which is very usefull to test various conditions using single if...else if statement.

When using if , else if , else statements there are few points to keep in mind.

- An if can have zero or one else's and it must come after any else if's.
- An if can have zero to many else if's and they must come before the else.
- Once an else if succeeds, none of he remaining else if's or else's will be tested.

Syntax

The syntax of an if...else if...else statement in C++ is −

```
if(boolean_expression 1) {
// Executes when the boolean expression 1 is true
```

} else if(boolean_expression 2) {
// Executes when the boolean expression 2 is true
} else if(boolean_expression 3) {
// Executes when the boolean expression 3 is true
} else {
// executes when the none of the above condition is true.
}

Example

```
#include <iostream>
using namespace std;
int main ()
{
        // local variable declaration:
        int a = 100;
        // check the boolean condition
        if( a == 10 ) {
        // if condition is true then print the following
        cout << "Value of a is 10" << endl;
        } else if( a == 20 ) {
        // if else if condition is true
        cout << "Value of a is 20" << endl;
        } else if( a == 30 ) {
        // if else if condition is true
        cout << "Value of a is 30" << endl;
        } else {
        // if none of the conditions is true
        cout << "Value of a is not matching" << endl;
        }
        cout << "Exact value of a is : " << a << endl;
        return 0;
}
```

When the above code is compiled and executed, it produces the following result −

```
Value of a is not matching
Exact value of a is: 100
```

C++ Ternary Operator

In C++, the ternary operator (also known as the conditional operator) can be used to replace if...else in certain scenarios.

A ternary operator evaluates the test condition and executes a block of code based on the result of the condition.

Syntax

condition ? expression1 : expression2;

Here, condition is evaluated and

if condition is true, expression1 is executed.
And, if condition is false, expression2 is executed.

The ternary operator takes 3 operands (condition, expression1 and expression2). Hence, the name ternary operator
.

Example : C++ Ternary Operator

```
#include <iostream>
#include <string>
using namespace std;

int main() {
  double marks;

  // take input from users
  cout << "Enter your marks: ";
  cin >> marks;

  // ternary operator checks if
  // marks is greater than 40
  string result = (marks >= 40) ? "passed" : "failed";

  cout << "You " << result << " the exam.";

  return 0;
}
```

Output 1

```
Enter your marks: 80
You passed the exam.
```

Lab Tasks

1- Mention the output for the following program:

```
#include<stdio.h>
void main()
{
  int a=100;
  if(a>10)
    printf("Shahid Afridi");
  else if(a>20)
    printf("Shoaib Akhtar");
  else if(a>30)
  printf("Kamran Akmal");
}
```

2- Write a program that takes a number as input from user and checks whether the Number is even or odd.
Using if-else:

3- Write a program that declares and initializes two numbers with your_roll_no and your_friend_roll_no and displays the greater of the two.

4- Write a program to read the age of a candidate and determine whether it is eligible for casting his/her own vote.

5- Write a program to find the maximum between three numbers by using the if-else statement.

6- Write a program to take a value from the user as input marks of five subjects Physics, Chemistry, Biology, Mathematics, and Computer. Calculate percentage and grade according to the following:
Percentage >= 90% : Grade A,
Percentage >= 80% : Grade B,
Percentage >= 70% : Grade C,
Percentage >= 60% : Grade D,
Percentage >= 40% : Grade E,
Percentage < 40% : Grade F,
Write this program with the help of if-else statement.